Supporting Information

Self-Supported Binder-Free Hard Carbon Electrodes for Sodium-Ion Batteries: Insights into the Sodium Storage Mechanisms

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Table S.1. Physical properties of all tested filter papers given by the manufacturer

	Cellulose filter paper			Cotton filter paper
Name	111A *(FP-A)*	M5 *(FP-B)*	15A *(FP-C)*	54 *(FP-D)*
Pore size	12-15µm	1.2µm	2.5µm	22 µm
Thickness	0.21mm	0.082mm	0.195mm	0.185 mm

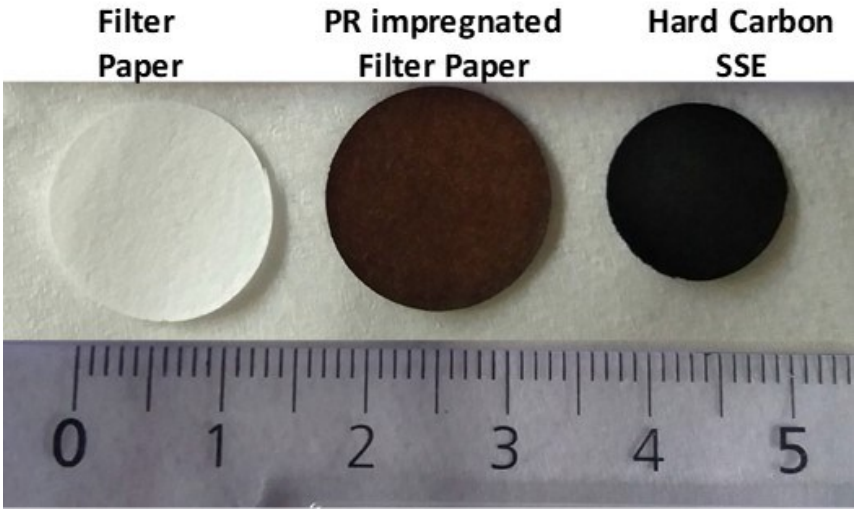

Figure S1: Photos of self-sustained filter paper, impregnated filter papers with phenolic resin and hard carbon.

Table S.2. Chemical composition of HC SSEs revealed by EDX results

Elements	Cellulose based SSE			Cotton based SSE
	HC-A	**HC-B**	**HC-C**	**HC-D**
C	92.25	87.50	96.40	96.90
O	7.05	8.50	3.57	3.10
Al	-	0.90	-	-
Mg	-	0.60	-	-
Si	-	0.90	-	-
S	-	0.30	-	-
Ca	-	0.40	-	-
Cr	-	0.90	-	-
P	0.20	-	-	-

Table S.3. XPS results showing the composition (at %) and repartition of components (%)

Sample	XPS					
	C (at%)	**O (at%)**	***Si (at%)**	**C(sp^2) %**	**C(sp^3) %**	**O/C**
HC-C	96.6	2.9	0.5	91.0	2.41	0.03
HC-D	97.7	1.7	0.5	93.7	0	0.017

***Si** amount coming from analysis tape used.

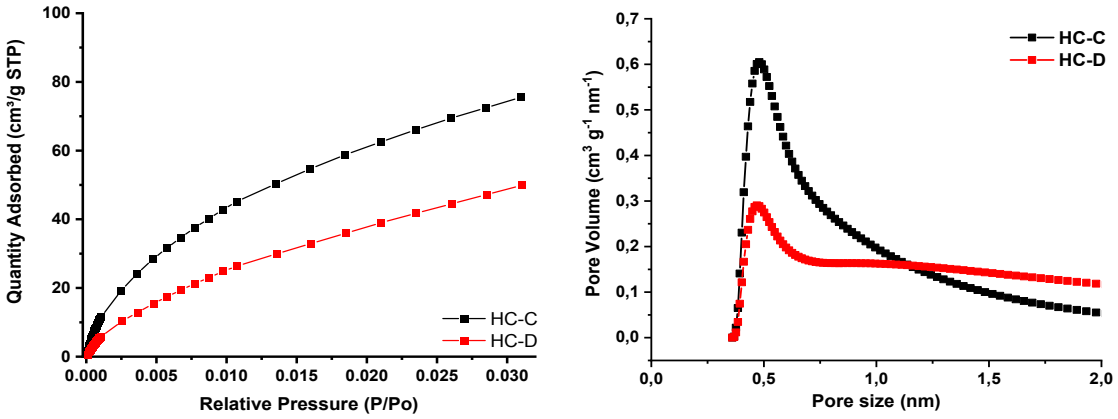

Figure S2. CO_2 adsorption isotherms (left) and CO_2 pore size distribution (right) of HC-C and HC-D self-sustained electrodes

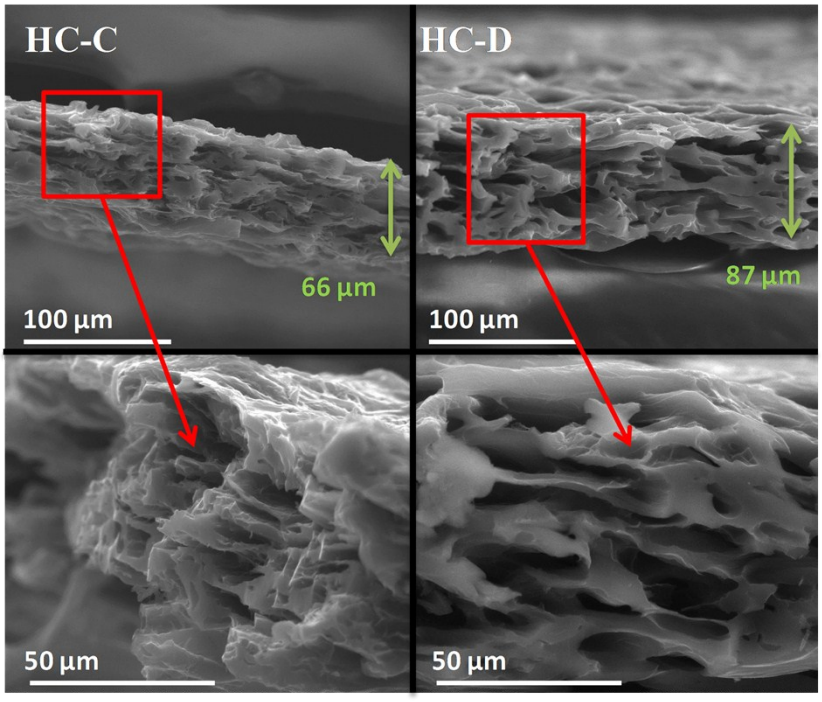

Figure S3. SEM images of cross-section view for HC-C and HC-D samples

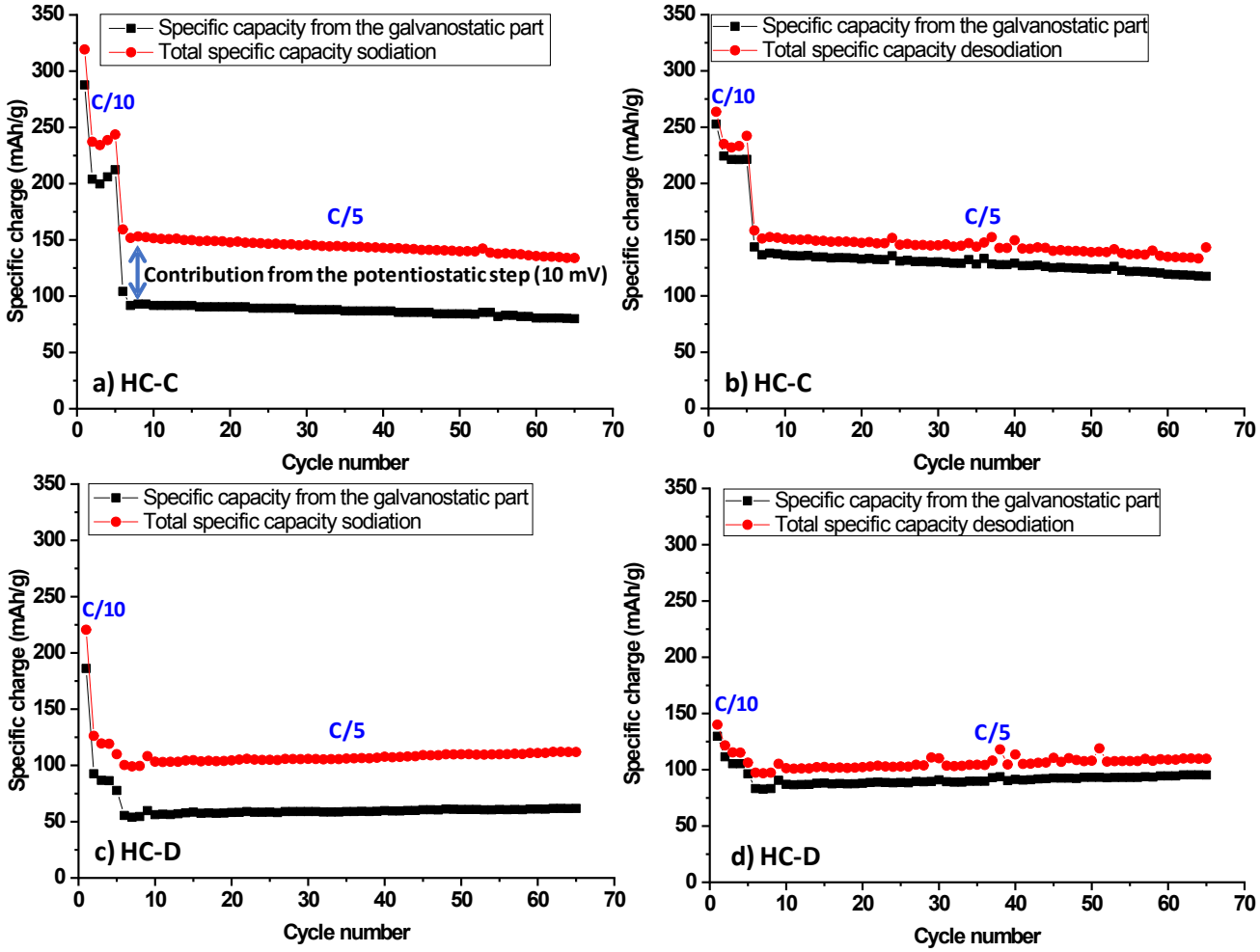

Figure S4. Discrimination between specific capacity contributions of galvanostatic and potentiostatic steps for samples HC-C (a,b) and HC-D (c,d) during sodiation (left side) and desodiation (right side)

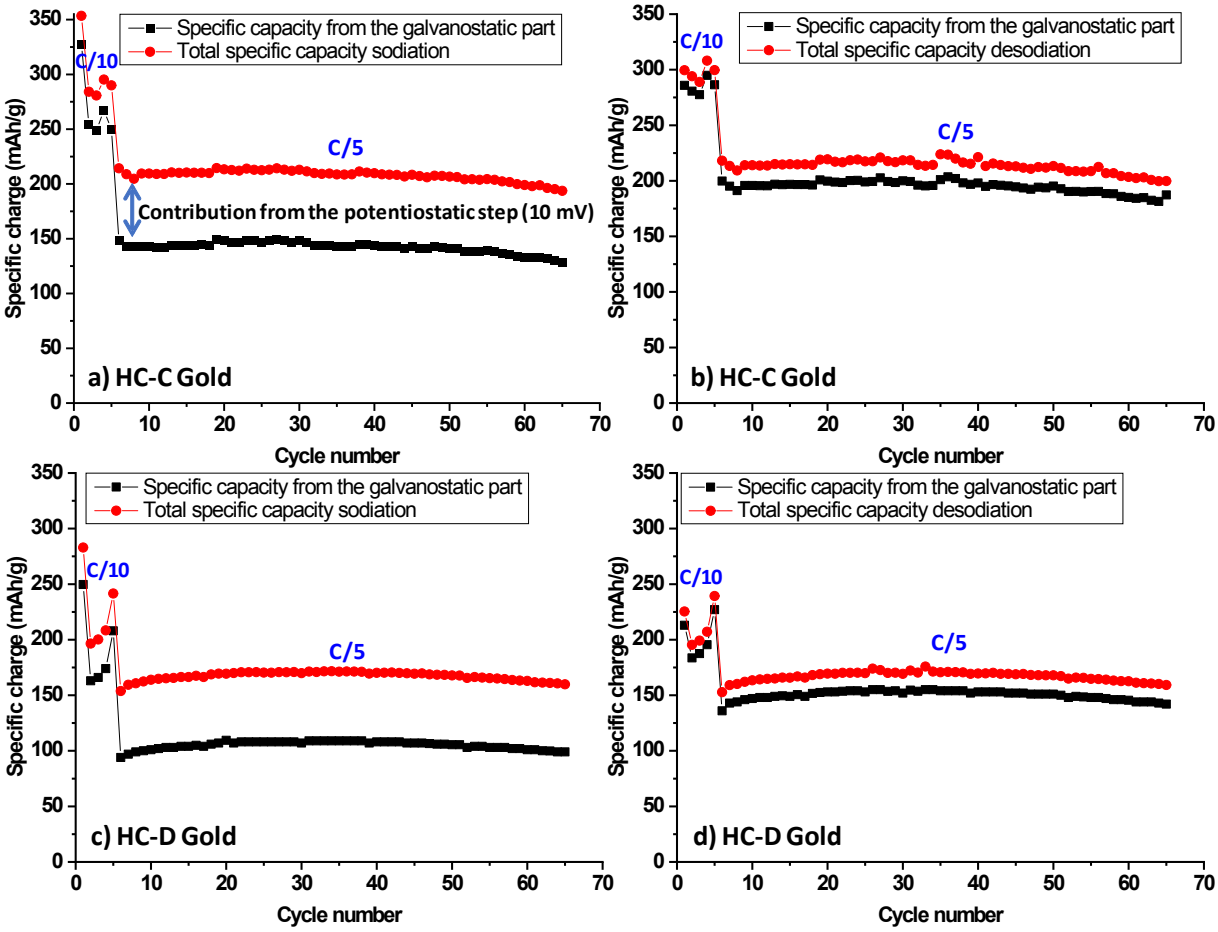

Figure S5. Discrimination between specific capacity contributions of galvanostatic and potentiostatic steps for gold sputter coated samples: a),b) HC-C and c),d) HC-D during sodiation (left side) and desodiation (right side)